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SOIL conservation

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It's all the same . . .

Whatever the use of natural resources, some basic things apply—ground rules, if you will. Under apple orchard or apartment complex, the soil's characteristics need to be accounted for; the way water will move across the property; and a host of other considerations.

Helping see that more of these basics are used in a fast-changing Nation is the work of SCS, outlined in several articles this month.

We begin with Administrator Grant's page because it sets forth some ideas that SCS and district leaders and many others need to ponder early in the game. The result of some hard SCS thinking is the next topic (p. 124), a long-range plan for the 1970's and beyond. Our annual report (p. 134), tells the whole story, reinforced by specific examples such as gully control in Alabama (p. 128), skiing facts from snow surveys (p. 132), and help in guiding fast urban growth (p. 130), and keeping sand dunes still in California (p. 126).

COVER: A quiet winter scene, and an over-snow machine that must be fun to drive—but serious business for SCS snow surveyors who help forecast for western water users how much water this mountain snow will make next spring.

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A time to take stock

The first year of a new decade has gone.

It was a year in which interest and concern about the state of the natural world and man's treatment of it became widespread. A clear majority of American citizens now look at their surroundings and at community decision-making in a new light.

It was a year during which important action took place in legislatures and executive departments—action that gives both business activity and conservation work a far different perspective than either had just a few years ago. The quality of this Nation's environment will be given long-term and pervasive attention.

What is the perspective? Americans want many things from their environment—and they are becoming more vocal in expressing their interests. They want a good food supply. They want clean and dependable water supplies for home and industrial use. They want clean air to breathe and see the world through. They want a horizon uncluttered by society's waste products. They want abundant outdoor recreation and protection of wildlife and scenic areas.

They want all these things—and they also want new homes, new automobiles, new highways, more of the manufactured goods that make up a better life.

Some of their wants work against one another. Achieving both material goods and a higher quality environment is a challenge. It requires some re-thinking on the part of the citizenry and of the government agencies and business firms that serve the public.

They need to reconsider their programs or operations in detail. Do they meet the "public interest" as well as they might? Do they try hard enough to wade through the maze of individual opinions and special-interest group statements—and the concerns of less vocal citizens—to assess the real public interest?

Do they make or work on the right things—and in the right order? Do they solve problems without creating others somewhere else? Do they look ahead to helping society meet positive aims as well as patching up America's faults?

The Soil Conservation Service has been re-thinking its role and its programs, as evidenced by a long-range plan that is discussed elsewhere in this issue. The process will not stop with a printed document—we must continue to reassess our helpfulness to America.

Most of the Nation's 3,000 conservation districts have taken a similar look at themselves and updated their long-range programs as needed. This, too, must be a continuing process—not a one-shot affair.

The Nation's businesses, communities, and private landowners need their own assessment of where they fit in a fast-changing world.

We have entered the decade of the 1970's. We can come out of it a better Nation by many standards of measurement.

Kenneth E. Grant

A plan for the future

By Floyd W. Campbell
Director, Program Planning Division
SCS, Washington, D.C.

In 1970 the Soil Conservation Service looked appraisingly at the America of the future.

Its aim? To determine how soil and water conservation can best help to shape a better America.

Its concern? We are living in an era where scientific and technological change is bringing rapid shifts in social values and living patterns. These shifts are bringing with them new concerns about man's environment and the quality of American life. In turn, these concerns bring a new urgency to conservation efforts. They bring an urgent need to *anticipate* future needs so that society—and agencies such as the SCS—can be in command of change and respond swiftly and constructively to new needs.

Leaders of SCS work in every state tried—with all the imagination and realistic foresight at their command—to put everyday concerns aside and place the future soil and water conservation job in perspective and focus on the direction it should take in the years ahead. From their discussions, a group of Washington, D.C., and field personnel prepared a draft plan. That plan was reviewed by all state conservationists, and a revised draft is now being reviewed by a wide segment of SCS people.

The mission

The outcome of the effort by spring 1971 will be a long-range plan to guide SCS in reaching its mission:

To assist in the conservation, development, and productive use of the Nation's soil, water, and related resources so that all Americans can enjoy—

- Quality in the natural resource base for sustained use.
- Quality in the environment to provide attractive, convenient, and satisfying places to live and work.
- Quality in family standards of living based on community improvement and adequate income.

Objectives

These three objectives reflect the concern of SCS for relating resources to the needs of people. They represent the focus for the long-range plan.

In a real sense the long-range plan clearly sets forth the reasons why the Soil Conservation Service exists. It lays out the need and charts the course for conservation work in the decade of the 1970's and beyond. It outlines the specific role of SCS in that work. It takes into account the social and economic setting for conservation. It summarizes the soil and water conservation needs of the Nation as they relate to SCS objectives. It sets forth the broad goals, principles, policies, plans, and institutional arrangements needed to reach these objectives. At the same time, the plan recognizes that goals can change with time. It has built in flexibility to accommodate changing needs.

A systems approach

Structuring the long-range plan has been a key effort. Long experience in helping watershed project sponsors and other groups and individuals has convinced SCS that any soil and water conservation action is a part of complex interrelationships among resources and among people.

The framework decided on for the long-range plan, then, was the "systems" concept. It tries to relate the objectives, benefits, causes, effects, resource management systems, and program activities to one another in a comprehensive nationwide approach.

It brings out the relationships and mutual concerns between rural and urban people, landowners and land enjoyers, and units of government and the people they serve. It relates the characteristics of natural resources to the action of men and machines on them.

In this setting we recognize that progress toward the objectives demands changes in resource use and

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improvements within resource management systems. A resource management system, in a broad sense, is the total of changes, improvements, and maintenance that takes place in any geographic area. The area may be a region, river basin, watershed, town-and-country area, urban-suburban area, farm, or other unit. In developing a resource plan for any geographic area the focus is on changes and improvements that will meet objectives of the concerned people.

Subsystems

To help us focus on these concerns in the long-range plan we have broken the resource management system for any area into subsystems—for example, land management, water management, stream management, wetland management, and waste management.

The land-management subsystem is further divided on the basis of primary use. It is made up of cropland, pasture, range, woodland, recreation-wildlife, urbanizing land, environmental corridors, transportation and transmission corridors, and surface mining.

Benefits and effects

In the plan, benefits are defined as the values to society that result from changes and improvements in resource management systems. Natural resource benefits express the quality condition of the resource as related to standards for sustained use. For example, the plan shows that less than 50 percent of the present cropland meets quality standards for sustained use to meet food and fiber needs. The benefit goal for cropland quality is to increase that percentage.

Other terms used in the plan to express natural resource and environmental benefits include land, water, and air quality; fish and wildlife habitat quality; natural beauty; recreation opportunities; and environmental quality for town-and-country and urban-suburban areas. Quality in family standards of living is expressed as job opportunities and economic efficiency.

Bridging the gap between the benefits and the changes or improvements in resource management systems are the conservation effects that result. Conservation effects are defined as the physical results, in contrast to the social, economic, and environmental results that express benefits.

The conservation effects are expressed as erosion control and sediment reduction, water storage, improved plant cover, drainage improvement, fish and wildlife habitat improvement, water conservation, pollution prevention and abatement, flood reduction, and improvement in patterns of resource use. Goals for conservation effects, and actions to achieve these goals, have been spelled out in the plan.

Action programs

The long-range plan also contains goals, policies, and plans for major program activities that involve SCS and other institutions and organizations. These program activities include resource technology development, surveying and monitoring, resource conservation planning, installation and maintenance assistance, and information and management support.

Program activity goals signal important changes in direction and emphasis. For example, an improved system for monitoring natural resource conditions is planned. Monitoring will focus on the quality condition of natural resources. It will be concerned with measuring the present resource condition, and with measuring the impacts caused by changing uses and improvements in resource management systems. Conservation standards will be needed to serve as benchmarks for monitoring resource conditions.

Working together

In the plan we recognize that widespread concern about man's environment should open participation in soil and water conservation to everybody. Society needs to be more concerned about the future consequences of current decisions. The Nation's local conservation districts and SCS long have realized that getting people to work together is the only way to achieve conservation and resource development work and insure the continued well-being of our country. As people work together they gain a fuller understanding about the quality of their environment and the condition of their natural resources. Their decisions then are more likely to help them attain their goal of a high-quality life. It is the intent of SCS to promote and strengthen this "working together" approach.

The long-range plan not only charts new courses for the Soil Conservation Service but also retains all those traditional goals, activities, and relationships that will continue to be meaningful in the 1970's. The result is a comprehensive look by many people at the long-range effort of SCS—a look hopefully that will help us all serve the changing needs of people in their drive for a better life. ♦

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Grass to the rescue . . .

Plantings halt march of Bodega Bay dunes

By Charles E. Swisher
Soil conservationist, SCS, Sebastopol, Calif.

Bodega Bay is a small port town of 500 people, 40 miles north of San Francisco. The bay itself, formed by an arm of land that juts protectingly out into the Pacific, is a picturesque haven for fishing boats and assorted seagoing pleasure craft.

It's the last place you would expect a need for grass and for Soil Conservation Service specialists. But grass and the know-how for using it may have saved a bay, a town, and a fishing fleet.

Blame that picturesque phenomenon—the shifting, barren, coastal sand dune—for the near-fatal threat to the economy of Bodega Bay. Credit local, state, and federal cooperation for putting the halter on this threat.

A veteran fisherman described how it was back in the early 1920's: "You couldn't see across the bay when the northwest wind blew."

It wasn't just the stinging, blinding misery. The windborne sand was filling the bay and closing off the channel. For boats to pass from docks to ocean fishing water, the channel had to be kept open. Any community that is about 50 percent dependent on fishing and 40 percent on water-oriented tourism can't afford to do otherwise. (About 10 percent of the economy is farm-based.)

The entire bay once was open. Those who can remember say it was a mile across, protected by the hook of land. Coastwise ships picked up and delivered freight and, as late as 1950, up to 600 fishing and pleasure boats used this port.

Bodega Bay's seaward-dune area once was covered with bush lupine, native grasses, and other coastal plants. Late in the 19th century, ground-covering plants began to disappear under the continuing pressure of grazing animals. More than a thousand acres of seaside "desert" developed.

Unprotected sand was picked up by wind. Slowly it filled the bay—including the ship and boat channel. After a storm, it was not uncommon to find ½ to ¾ inch of sand on decks of boats anchored in the bay.

The U.S. Army Corps of Engineers, charged with keeping navigation waters open, dredged the channel three times, but sand kept on filling the waterway. Keeping the channel open became impractical. In 1952, the Corps was ready to throw in the towel.

The sand came from a strip between bay and ocean—a strip about 1½ miles long and a mile wide. Mostly barren dunes occupied the strip. At the time, half this land was owned by farmers and half by the California State Division of Parks and Beaches.

Most private owners were members of Bodega Bay Grange—an organization interested in community affairs. It was natural to seek help there. Since the area was within the Gold Ridge Soil Conservation District, it also was natural to ask the district for help.

Grange officials asked district directors—President Ezra Briggs, W. K. Heathorne, Charles Goodale, Lloyd Dillaha, and Earl Schock—whether a program could be worked out to control the drifting sand and save the community.

The answer: Yes.

California Parks and Recreation Department and the Gold Ridge District worked up a contract to cover project costs. The Bodega Bay Grange offered help with labor. SCS would supply technical help.

SCS district conservationist then was the late Warren W. Wood.

Walter R. Weeks, conservation technician, was his assistant. Their job was to find ways of establishing plant cover on the dunes.

Wood gathered local information about previous work on dunes. The SCS plant material centers were a primary source. Weeks went to Florence, Oreg., where similar dune work was underway. He bought a tomato planter for planting clones of grass.

At Bodega Bay, Wood learned that early in this century farmers bordering the dunes found a grass —European beachgrass, *Ammophila arenaria*—that would grow in sand and tie it down. The grass had been introduced as a sand binder at San Francisco's Golden Gate Park. It was growing at various places along the Pacific Coast.

Bodega Bay farmers acquired some clones of the grass and began planting it on dunes near their land. The job was only partially successful—but valuable information resulted.

With what had been learned and with alterations on the tomato planter, Wood and Weeks launched a program of stabilizing the sand dunes of Bodega Bay. A six-man crew under Weeks' supervision dug grass from old plantings on nearby farms and on state park land, separated them into clones, and bundled them for use in the planter. Four people planted, one drove a tractor pulling the planter and one kept the planter supplied with clones.

Acre after acre of sand dunes was planted. This had to be done in December and January to insure sufficient moisture.

Hummocks were smoothed with a bulldozer in places so the planter could get over the ground.

The planned pattern planting was for 75,000 clones of beachgrass an acre, 12 inches apart in rows spaced 15 inches apart.

Wind blew out the grass in some areas despite the most careful effort in planting, and other areas could not be smoothed enough for planting. In blowouts and rough areas, Boy Scout, Girl Scout, and Grange volunteers planted the clones by hand.

A lesson learned was that fertilizing at the time of planting and each second year thereafter made the grass grow faster and stand up better under dry summer weather.

European beachgrass not only *thrives* in blowing, shifting sand—it needs this condition to stay vigorous and continue growing. But the object was to stabilize the sand, and stop it from shifting and blowing.

Grass on the dunes: With a converted tomato planter (far left) this crew of six can cover 30 acres in a planting season. Two years later a good stand is up (left); but where wind has blown out the seedlings, replanting is done by hand (below). Result is a picturesque flat (far right) protected from threatening dunes.

Success in this meant the beachgrass would lose its vigor. Fertilizer is needed to keep it growing.

Many trees, shrubs, and grasses were tested to supplement beachgrass as the sand became stabilized. Monterey cypress, Myoporium, bush lupine, ice plant, false brome, and Veldt grass showed promise.

Only a small amount of the original thousand acres remains to be planted. Most dunes are covered lushly with grass. Secondary plantings fill in between the rows and help hold the sand.

Blowing sand no longer threatens to close the channel in Bodega Bay. The channel was dredged again in 1968, and Sonoma County installed a launching ramp.

The state now owns 90 percent of the beach and has made it part of Sonoma State Beach. Picnic and camping areas, roads, and other recreation facilities are planned. The future of the community is assured. ♦

Gullies yield to team effort

Control of gully and critical area erosion has become a major objective in the Wiregrass Resource Conservation and Development Project in southeastern Alabama.

Farmers, city and county government, and state and federal government are joining local soil and water conservation districts to tackle a problem that for many years has plagued the Wiregrass area.

The problem: 3,000 caving gullies, 2,700 miles of unprotected highway roadbanks, 20,000 acres of strip-mine spoils, and inadequate cropland water-disposal systems that are pouring tons of sediment into lakes and streams each year.

Not only is this erosion damaging valuable upland, but it also is killing hundreds of acres of hardwood timber growing on the bottom land. It has practically eliminated fish and wildlife habitat in the area's creeks and rivers.

A program to reduce the erosion menace was initiated in 1969. The sponsors, county Agricultural Stabilization and Conservation committee and soil and water conservation district supervisors, joined to formulate a special gully-control practice.

More than 100 landowners stabilized about 350 acres of critical area with cost-sharing assistance of the Agricultural Stabilization and Conservation Service. SCS specialists provided engineering assistance through local districts, designing and laying out 27 grade-stabilization

structures, and recommending application of seed and fertilizer for proper vegetation.

In 1970, all nine counties in the Wiregrass Project participated in the program. About 125 applications totaling $135,000 were approved.

In some counties and locations, the enormous size of some gullies prevents their treatment under the Agricultural Conservation Program. But if more than one individual is involved and the cost-benefit ratio is acceptable RC&D funds may be used to install the structures. Three gullies of this type have been treated in Dale, Coffee, and Barbour counties.

City and county governments have moved into the act. In the city of Ariton in Dale County a large gully threatened to undermine several buildings. SCS engineers worked out a plan to stabilize the area. The county provided labor and equipment to fill and slope the gully as planned, local farmers provided seed, fertilizer, and mulch, and the Alabama Highway Department installed a concrete gutter and pipe-drop outlet to carry the water to a controlled grade.

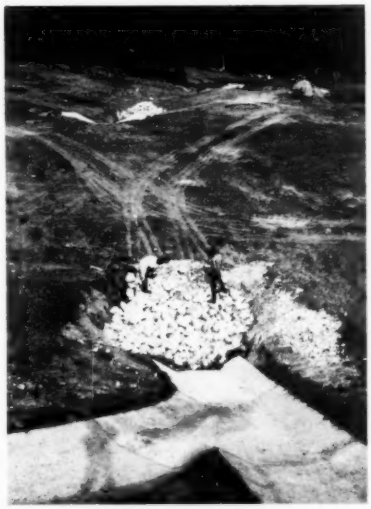
At Camp Meadow Woods, the area Girl Scout camp in Houston County and the Houston County District furnished burmudagrass sprigs and labor to spread the fertilizer and plant the grass. The Girl Scouts planted Arizona cypress trees on a part of the critical area.

SCS did the survey and design work and supervised the installation of all gully-control work completed in the project area.

Dramatic progress also is being made on roadbank stabilization. Covington, Barbour, Dale, Geneva, Pike, and Crenshaw counties have all completed RC&D contracts to stabilize critical areas on about 75 miles of county roads. About 200 acres have been treated. RC&D funds were used for seed, fertilizer, and plant materials while the county governments provided labor and equipment to fill and shape the areas, prepare seedbeds, and plant the grass.

Progress also is being made on mined-land reclamation. A local contractor in Pike County is working with landowners to complete 300 acres of land smoothing and tree planting on erosive spoil areas. New legislation signed by the Governor in 1969 requires that all new-mined areas be smoothed and planted to trees by the mining companies. With renewed interest in erosion control and favorable legislation on the books, the RC&D sponsors expect continued progress in mined-land stabilization.

The Wiregrass RC&D sponsors, USDA agencies, city, county, and state governments, and individual land users have a renewed interest in erosion control in the Wiregrass area. Efforts of these agencies and individuals are saving valuable land and curbing one of the area's most damaging pollutants, sediment.—CAMERON F. LYLE, *project coordinator, SCS, Wiregrass RC&D Project, Ozark, Ala.* ♦



A huge gully that threatened to undermine a paved road (above) was fixed with a series of dams with concrete flume overfalls (below).

The trash-filled gully that District Conservationist T. R. Nabors views (above) now is a bermudagrass field (below).

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Facts for urban growth

By Thomas P. Helseth
State conservationist, SCS, Berkeley, Calif.

In California—where population has doubled every 20 years for a century—regional, county, and city officials have turned to the soil survey for information essential to their planning work.

For three decades soil surveys made by the Soil Conservation Service have been a primary tool in halting erosion and promoting good land use on farmlands. But soil surveying geared to agricultural needs in California has been lagging behind the demands of urban land use planners for maps and data. To speed fieldwork and publication of soil surveys, several California agencies have been helping with funds. These agencies have committed more than a quarter of a million dollars toward soil survey speedup. Amounts contributed have varied from $750 to nearly $100,000.

In California, galloping urbanization has had a serious side effect—inflation of land values raising taxes and often driving farmers off prime farmland. California agriculture yields $4 billion a year in income, and losing large amounts of cropland is as serious as losing factories and businesses.

To meet this threat, the California Legislature passed the California Land Conservation Act permitting counties to set up "agricultural preserves." Landowners in preserves may have their land taxed on an agricultural basis if they agree to restrict land use to agricultural purposes. Soils information helps county officials judge which land is eligible for this preserve status.

There also is a growing demand for identification and preservation of land in open space. Soil maps are proving helpful in long-range planning to fill this need.

Another concern involves soil erosion and water pollution from urban development as well as from farming. Soils information permits conservation planning to keep soil from eroding and polluting rivers, lakes, and harbors.

San Diego County, said to be the fastest growing area in California, has made a substantial financial contribution toward publication of the soil survey reports including special interpretations needed for planning and zoning. The County Planning Department also has contributed staff help.

"There's a real awareness in San Diego County that open space must be saved," said Senior Planner Roy Griffin, county project manager for soil interpretations. He notes a trend toward conserving farmland for open space. Another need is for the kind of soils information that will help prevent residential developments on unsuitable soils.

Four soil surveys have been completed and three published in the Los Angeles area with local cost and work sharing. Interim reports were published for the Saugus-Newhall and Malibu areas since the information was needed before the final publication because of heavy population growth.

The Antelope Valley soil survey, which covers the Saugus-Newhall area, and the Ventura soil survey were published last year.

Agriculture in Monterey County brings in more than $150 million annually, according to Melvin G. Bakeman, assistant to Planning Director E. W. DeMars. With what's happening to the north and south—in the San Francisco Bay area and the Los Angeles area—county supervisors and planners understandably want to avoid chaotic development.

"Our master plan—based on soil surveys—shows better soils reserved primarily for agricultural use," Bakeman said. About 275,000 acres are zoned for agriculture. The county and other agencies made substantial contributions toward completion of the soil survey fieldwork.

Santa Clara County on the southern rim of San Francisco Bay has real growing pains. Prime farmland is being urbanized rapidly, creating a variety of land use problems. The County Flood Control and Water District and the Black Mountain, Evergreen, and Loma Prieta soil conservation districts helped with the early printing of a special soils report for the county. This special report and interpretations were published with the aid of a planning grant from the Department of Housing and Urban Development and staff help by the County Planning Department.

City officials in the county are analyzing subdivisions on the basis

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of this interim soils report. Much of the county is outside incorporated areas, but presumably the remaining land will be annexed ultimately. Without proper planning based on soils information, the cities could inherit more land problems, explained Arthur Ogilvie, senior planner of the County Planning Department.

Yolo County's early soil survey lacked details needed for present-day planning and development, according to Robert Peterson, county planning director. The current survey, for agricultural use, would have taken another 10 years to complete. Yolo County and the soil conservation districts in the county entered into an agreement with SCS in 1963 to accelerate the field survey. The county also provided equipment and personnel to dig soil survey pits. SCS added two scientists, making a four man survey party. As a result, final field maps were completed in late 1966. The general soil map was published in 1969.

A major concern in Yolo County —mostly rural country northeast of the San Francisco Bay area—is protection of farmland from the pressures of nonfarm use. The county acted to set up agricultural preserves under the Land Conservation Act. John McCoy, senior rural appraiser in the Yolo County Tax Assessor's office, says applications for preserve status—and the lower taxes—are checked against the soils report to determine whether the land is prime for agricultural use.

Several multicounty organizations have been formed in California to deal with planning, development, and environmental problems that cross county lines. Among these is the Association of Bay Area Governments covering nine counties. The association cost-shared a general soil map of the area for use in regional planning.

Others that have contributed toward soil survey speedup and publication are: Fresno, San Mateo, Nevada, Placer, Solano, Santa Cruz, and San Bernardino counties and the U.S. Army (Sierra Army Depot, Lassen County). ♦

Galloping urbanization means quick planning decisions and need for resource information on which to base them.

We know about snow

By P. E. Farnes
Snow survey supervisor,
SCS, Bozeman, Mont.

Skiing and snowmobiling are among the fastest growing forms of recreation in the West. Snow is necessary for both.

A good ski area should have dependable snow year after year. It should have enough snow to open around Thanksgiving in most years and by Christmas in all years.

Not all mountain areas can meet this requirement. Storm patterns and topography combine to provide highly variable snowfall patterns throughout the West.

In Montana, snow-survey data have been used to delineate areas that have adequate natural snowfall for development of winter sports sites. The Montana Snow Survey Unit of SCS has prepared maps of the area for SCS offices in the state.

Criteria to develop the maps were based on skiable snow accumulations by mid-December in 19 out of 20 years with normal opening in late November. The maps are only an aid, of course.

Landownership, population, transportation, available capital, terrain, and wind also are important considerations in selecting a specific site for a ski area. The map shows areas with adequate snow and the minimum elevation that should be considered for the basic facility.

When a specific site is selected and a group is interested in development, SCS prepares a snow-evaluation report for the site on request. Actual snow measurements then should be made since weather conditions in mountainous areas are unstable. Terrain and storm patterns can create "rain shadows," or areas that have less precipitation

than comparable areas nearby.

Long-term snow-survey records can be used to show variation in snow accumulation over long periods.

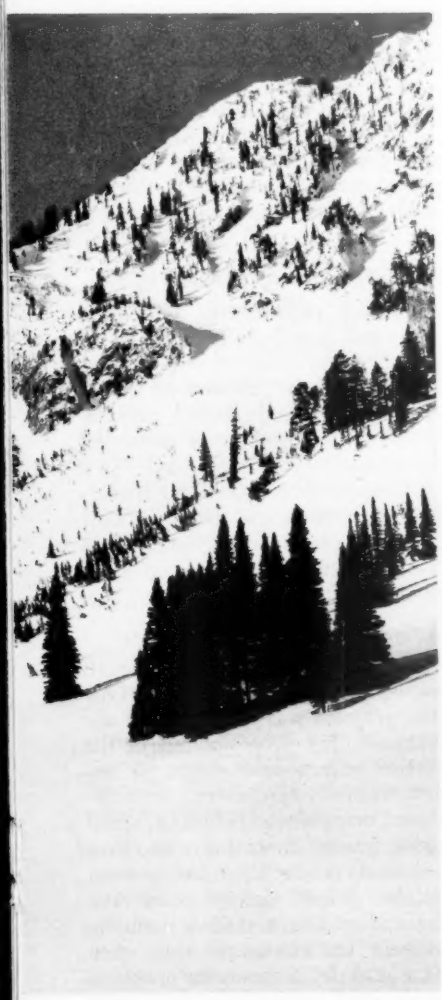
SCS and cooperating agencies have been making snow surveys in the West for more than 30 years, to forecast the streamflow in spring and summer.

These forecasts aid in farming, regulating reservoirs, scheduling releases of water for pollution abatement and fisheries improvement, determining municipal and industrial water supplies, and other uses.

Collected data also provide the basis for other analyses. Snow affects wintering of big game animals, increases roof loads on structures, and affects street and highway maintenance costs. Long-term measurements also provide a monitor of any change in mountain precipitation that can result from increased population and industrial activity.

The snow measurements now have another use—to aid in developing good ski areas for recreation and new income for the West. ♦

SCS snow surveyors travel to snow courses on snow machine (right), skis, snowshoes, and by helicopter to measure the water stored in the snowpack.



Good place for a major ski area (left), or not dependable? Long-term snow measurements can help tell.

Surveyors (below) measure the winter's accumulation of snow and its moisture content.

In service to America

Summary of activities of the Soil Conservation Service for fiscal year 1970

In the first year of the new decade, the Soil Conservation Service assisted a growing number of units of government in coping with town and country growth and land use change.

The conservation principles that benefit farm, ranch, and forest lands are proving equally effective for resources in residential, industrial, transportation, fish and wildlife, and recreation uses.

New emphasis was placed in fiscal year 1970 on efforts to plan conservation action on an areawide basis; to improve the quality of living and increase job opportunities in rural communities; and to implement the growing desire of Americans to keep their Nation beautiful.

Meanwhile, requests for technical assistance on farms and ranches remained at high levels from rural and suburban land owners and users in 3,026 local conservation districts.

By the end of fiscal year 1970 the districts had 2.2 million cooperators who were applying and maintaining soil and water conservation.

Assistance to communities

The number of responses by SCS to requests from state and local units of government climbed to 61,200 in 1970, a jump of more than 10,000 over a year ago.

SCS specialists provided 6,511 resource inventories and evaluations to planning commissions or other agencies of local, state, or federal government. They made field investigations and recommendations on land use and treatment of proposed sites for 1,559 public facilities such as schools, hospitals, sanitary landfills, transportation facilities, recreation areas, and water and sewer facilities.

A total of 303 land use regulations, zoning ordinances, sanitary codes, and building codes or standards were issued or enacted by government bodies—with soil surveys and other technical information provided by SCS.

Assistance to individuals

SCS conservationists and specialists provided 3.1 million technical services to 1.1 million individual land owners and users in conservation districts. SCS helped prepare more than 75,000 conservation plans covering nearly 28.7 million acres and helped revise 36,328 plans covering nearly 22 million acres. More than 575 million acres of private land in the United States now is covered by plans for resource protection and proper use.

Nearly 700,000 district cooperators applied one or more conservation practices during the year, raising the total of land adequately treated for its conservation needs to more than 587 million acres.

Resource conservation and development

SCS assisted 55 Resource Conservation and Development projects. Thirteen others were being planned with SCS help. The combined area of the 68 projects totals 244 million acres.

Completed project measures—the specific activities planned by local citizens to improve the economy and the quality of living in the project area—totaled 2,249.

Fifty-one applications for project assistance in the program are awaiting authorization. They represent a total area of 189,653,000 acres.

In fiscal 1970 local citizens received technical assistance, loans, and other help for more than 7,000 measures with tangible community benefits. The actions dealt with a broad variety of problems and opportunities for the use and development of soil, water, and related resources.

Great Plains Conservation Program

In fiscal 1970 another 5.3 million acres was placed under Great Plains Conservation Program contracts as 3,038 additional farmers and ranchers in 440 participating counties began installing needed conservation treatment on their land.

More than 37,000 land owners and operators across the Plains now have completed or are under contract to complete conservation on 67 million acres.

Action in watershed projects

In fiscal 1970, the 1,000 small watershed project in the Public Law 566 program was approved for operations. The program, one of the early Congressional efforts in environmental improvement, was designed originally to help local sponsoring groups control erosion, slow sediment production, and prevent floods. Water supply, recreation, fish and wildlife, and other multiple-purpose features added since then have provided a means for people to meet broad and positive community aims. They also have resulted in

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many new jobs in rural towns. Construction and economic activity prompted by the program already have produced an estimated 57,000 new jobs.

Since its inception the watershed program has kept an estimated 13 million tons of soil out of streams and reservoirs and off bottom lands.

Project reservoirs have stored and protected water supplies for 281,000 people.

Other significant benefits include:

—320 million dollars of agricultural and nonagricultural flood damages prevented.

—120,000 acres of land and water-habitat improvement for fish and wildlife.

—10 million visitor days of recreation provided annually.

Soil surveys

With demand for soil survey information sharply on the increase, SCS sent 40 new surveys to the printer in 1970.

Soil scientists in the National Cooperative Soil Survey mapped 43 million acres in the year. Total acreage now mapped is 837 million.

Use of soil surveys is expanding rapidly among town, city, county, and regional planners and among engineers, architects, and sanitary and zoning officials. Use of soil surveys for farm, ranch, and woodland planning has remained at a high level.

Snow surveys

SCS made marked progress in 1970 toward the time when, through automatic telemetry, it can obtain in any given time schedule snow depth, water content, soil moisture, rainfall, wind velocity, and relative humidity data to forecast water supplies for Western States.

Six new automatic telemetry stations were installed in Utah and another in Idaho. The number of stations in the snow-survey automatic network now is 78. Another station is being installed in Colorado.

SCS is working with atomic-energy groups to evaluate a new isotope unit that shows promise for providing more detailed information on snowpack and related conditions.

River basins

River basin studies are providing needed information for state water plans, comprehensive river basin plans, river basin commissions, regional planning commission efforts, regional development plans, and other activities involving soil and water resources on a regional or subregional basis.

In 1970 the Department of Agriculture, with SCS providing leadership, carried on investigations in 64 river basins. Nineteen of these are comprehensive interagency studies being coordinated by the Water Resources Council under the Water Resources Planning Act of 1965.

Requests for assistance by SCS in the cooperative river basin study program (Type 4) continue at the rate of six or seven a year.

Cropland treatment

Farmers made significant progress in the use of modern conservation systems, particularly minimum tillage. They planted an estimated 7 million acres in 1970 under this new concept of planting directly in a ground cover of crop residues, in one trip across the field. Five years ago, less than 10,000 acres was planted in this way. Various methods of minimum tillage can cut soil erosion 65 to 95 percent.

Use of terracing to control water flow across sloping land continued strong, with landowners constructing more than 30,000 miles of terraces during the year. Nearly a fourth of the total was in parallel terraces, which are well adapted to today's large and powerful farming equipment.

Grazing land

Proper grazing use, planned grazing systems, and fertilization gained during fiscal 1970. Proper grazing use was practiced on more than 70 million acres and rotation deferred grazing on 3.7 million acres. More than 3 million acres of pasture- and hay-land planting was reported, and 507,000 acres of range seeding. Pasture- and hay-land management now on the land increased nearly 6 million acres to a new total of 54,396,771 acres.

Woodland

District cooperators planted trees according to conservation plans on 341,539 acres during the year and made direct woodland seedings on 11,921 acres. They planted 42,580 acres of farmstead and feedlot windbreaks and 3,559 miles of field windbreaks. Woodland improvement totaled 473,135 acres, and 60,024 acres was shifted from cropland into woodland use. Woodland harvesting was improved on 1,383,210 acres. A growing number of woodland owners, however, are less interested in production of wood crops than in the recreation, natural beauty, and other qualities of a stand of trees.

Developing information on how different kinds of soil respond to woodland use is a continuing SCS effort. An automatic data processing subsystem has been set up for storing, summarizing, and retrieving soil-site index information. The records already available now are being coded for input into a computer data bank.

Wildlife land

Wildlife habitat management was practiced on more than 5 million acres, an increase of nearly 25 percent over last year, and wildlife wetland management was practiced on nearly 400,000 acres.

Fish farming

Interest in onfarm commercial production of channel catfish continues to grow in many states across the Nation. SCS gave technical assistance during the year to thousands of landowners for establishing catfish ponds or raceways. Other landowners have requested SCS help in growing trout for processing or recreational fishing. Both kinds of

Summary of Progress, Fiscal Year 1970

Total reportable progress in soil and water conservation programs assisted by the Soil Conservation Service

Progress items	Total reportable progress	Cumulative to June 30, 1970
Conservation plans and Related services		
District cooperators ..... No.	92,498	2,216,655
" " " ..... acres	35,131,574	753,628,405
Cooperators canceled ..... No.	62,968	—
" " " ..... acres	21,505,021	—
Recipients of technical assistance ..... No.	1,158,708	—
Technical services ..... No.	3,108,942	—
Recipients applying practices ..... No.	691,228	—
Special mapping for planning and CNI ..... acres	3,374,896	231,576,971
Conservation plans prepared... No.	75,397	1,744,639
" " " " ... acres	28,661,801	575,180,612
Conservation plans canceled... No.	47,502	—
" " " " ... acres	15,399,438	—
Conservation plans revised..... No.	36,328	—
" " " " ... acres	22,008,975	—
Inventories and evaluations prepared ..... No.	33,982	—
Federal lands in coordinated conservation plans ..... No.	121	962
" " " " acres	1,443,671	11,194,767
State and county CNI reports ..... No.	173	—
Resource planning and implementation		
Services on resource plans ..... No.	61,272	—
Units of government assisted ..... No.	19,824	—
Resource plans prepared ..... No.	929	—
Inventories and evaluations for resource plans ..... No.	6,511	—
Land use regulations established ..... No.	303	—
Site selection for public facility ..... No.	1,559	—
Operating units		
Total operating units ..... No.	9,231	4,540,969
" " " ..... acres	1,865,433	1,382,778,746
Miscellaneous land users ..... No.	627,624	3,843,968
Resource planning units ..... No.	4,142	79,049
Group plans, services, and installation plans		
Group plans prepared ..... No.	2,158	8,625
" " " ..... acres	2,004,245	10,868,787
Group inventories and evaluations ..... No.	4,724	54,132
" " " ..... acres	7,893,425	46,813,746
Group plans installed ..... No.	4,053	51,067
" " " ..... acres	1,962,524	28,817,613
Groups assisted ..... No.	12,187	—
Services to groups ..... No.	78,115	—
Groups applying practices ..... No.	3,944	—
Great Plains Conservation Program		
GP applications received ..... No.	3,973	43,861
" " " ..... acres	7,068,987	82,818,187
GP contracts signed ..... No.	3,038	37,703
" " " ..... acres	5,302,970	67,528,916
GP contracts terminated:		
By mutual consent ..... No.	143	1,095
" " " ..... acres	136,947	1,542,591
For cause ..... No.	55	823
" " ..... acres	42,341	700,175
By expiration ..... No.	3,192	17,345
" " ..... acres	5,943,699	28,656,557
(Total terminations) ..... No.	(3,390)	(19,263)
" " ..... acres	(6,122,987)	(30,899,323)
Cropland before GP contract ..... acres	824,644	10,466,248
Planned cropland conversions ..... acres	139,592	2,107,945
Servicing other USDA programs		
Referrals serviced:		
ACP—F. Y. 1970 ..... No.	281,074	—
" —P. Y. 1969 ..... No.	—	282,365
Cropland Adjustment Program ..... No.	39	—
Cropland Conversion Program ..... No.	16	—
Appalachian Program ..... No.	1,368	—
Conservation plans approved ..... No.	1,706	—
Soil surveys		
Detailed soil surveys ..... acres	41,213,428	785,651,857
Reconnaissance ..... acres	1,985,693	25,671,600
(Total surveys) ..... acres	(43,199,121)	(811,323,457)
Soil conservation surveys ..... acres	—	25,942,162
Soil conservation surveys canceled or converted ..... acres	1,377,436	—
Snow surveys and water-supply forecasting		
Snow course measurements ... No.	6,335	—
Aerial snow marker readings ..... No.	1,148	—
Mountain precipitation gage readings ..... No.	1,885	—
Soil moisture station readings ..... No.	1,385	—
River stations for which numerical forecasts issued... No.	408	—
Numerical forecasts issued ... No.	1,941	—
Recreation developments		
Land owners and operators who have:		
Established their first commercial recreation enterprise ... No.	1,720	53,713
Expanded or added to commercial recreation enterprises ... No.	855	—
Changed to recreation enterprises as their primary source of income ..... No.	257	10,359
" " " ..... acres	84,912	1,883,019
Private noncommercial recreation facilities established or expanded ..... No.	29,933	505,255
Public recreation facilities established or expanded ..... No.	611	33,118
Watershed and RC&D Project measures		
Floodwater structure site investigated ..... No.	493	—
Channel site investigated ... miles	574	—
Flood structure surveyed ..... No.	378	—
Channel surveyed ..... miles	758	—
Flood, structure designed ..... No.	459	—
Channel structure designed... miles	550	—
Services on land rights ..... No.	21,810	—
Flood structure under construction ..... No.	511	—
Channels under construction ..... miles	900	—

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Summary of Progress, Fiscal Year 1970

Total reportable progress in soil and water conservation programs assisted by the Soil Conservation Service

Practices	Total reportable progress	On the land June 30, 1970
Bedding ..... acres	21,915	613,064
Brush control ..... acres	4,331,603	44,626,800
Chiseling and subsoiling ..... acres	908,544	6,740,236
Clearing and snagging ..... miles	768	5,588
Conservation cropping system ..... acres	22,278,148	189,556,057
Contour farming ..... acres	3,388,844	47,043,816
Controlled burning ..... acres	362,108	6,846,542
Critical area planting ..... acres	124,655	4,924,969
Crop residue management ..... acres	20,747,854	157,430,286
Dam, diversion ..... No.	609	25,726
Dam, multiple-purpose ..... No.	318	5,733
" " " ..... acre-feet	187,388	9,155,868
Debris basin ..... No.	1,523	83,092
Deferred grazing ..... acres	12,859,236	65,304,265
Dike ..... miles	303	10,730
Diversion ..... miles	2,326	98,274
Drain ..... miles	25,965	776,278
Drainage field ditch ..... miles	5,520	172,220
Irrigation canal or lateral ..... miles	254	45,529
Irrigation ditch and canal lining ..... miles	1,261	26,480
Irrigation pit or regulating reservoir ..... miles	1,145	47,541
Farmstead and feedlot windbreak ..... acres	42,580	774,756
Field border ..... miles	1,336	45,111
Irrigation field ditch ..... miles	1,750	127,124
Field windbreak ..... miles	3,559	87,450
Fishpond management ..... No.	61,093	545,088
Floodwater diversion ..... feet	94,258	1,324,278
Floodwater retarding structure ..... No.	412	10,092
" " " ..... acre-feet	228,784	5,263,592
Floodway ..... miles	35	713
Grade stabilization structure ..... No.	12,915	210,634
Grassed waterway or outlet ..... acres	79,040	1,839,025
Grazing land mechanical treatment ..... acres	53,169	1,390,860
Hedgerow planting ..... miles	321	25,010
Hillside ditch ..... miles	145	2,341
Irrigation pipeline ..... miles	4,355	69,600
Irrigation storage reservoir ..... No.	450	40,214
" " " ..... acre-feet	16,801	7,760,212
Irrigation system, sprinkler ..... No.	4,553	120,649
Irrigation system, surface and subsurface ..... No.	5,801	139,840
Irrigation system, tailwater recovery ..... No.	1,042	12,303
Irrigation water management ..... acres	4,080,008	18,703,546
Land grading for drainage ..... acres	36,204	385,132
Land leveling for irrigation ..... acres	382,307	10,929,988
Land smoothing ..... acres	305,084	6,938,316
Main or lateral drainage ..... miles	5,950	350,645
Minimum tillage ..... acres	2,032,106	18,582,842
Mulching ..... acres	39,421	728,000
Pasture and hayland management ..... acres	10,988,622	54,396,771
Pasture and hayland planting ..... acres	3,079,668	64,594,156
Pipeline ..... miles	2,526	26,790
Pond ..... No.	47,118	1,748,629
Proper grazing use ..... acres	70,721,437	243,863,995
Pumping plant for water control ..... No.	1,850	55,819
Range seeding ..... acres	507,099	14,100,233
Range rotation—deferred grazing ..... acres	3,715,632	18,487,042
Recreation area stabilization ..... acres	2,348	109,023
Recreation area improvement ..... acres	45,621	601,104
Recreation land grading and shaping ..... acres	15,551	211,005
Recreation trail and walkway ..... miles	598	6,276
Road, access ..... miles	2,019	14,470
Spring development ..... No.	4,148	116,998
Stock trail ..... miles	195	3,901
Streambank protection ..... miles	306	7,322
Stream, improvement for fish ..... miles	11	93
Stream, channel stabilization ..... miles	24	719
Stream, open channel ..... miles	1,098	15,238
Stripcropping ..... acres	511,072	21,260,399
Structure for water control ..... No.	73,566	2,032,142
Terrace, basin ..... miles	100	1,829
Terrace, gradient ..... miles	12,426	757,815
Terrace, level ..... miles	11,002	384,225
Terrace, parallel ..... miles	7,097	69,610
(Total terraces) ..... miles	(30,625)	(1,213,479)
Toxic salt reduction ..... acres	55,284	1,453,599
Tree planting ..... acres	341,539	18,709,529
Trough or tank ..... No.	12,674	440,520
Waterspreading ..... acres	39,362	974,568
Well ..... No.	7,278	492,933
Wildlife wetland management ..... acres	377,903	3,561,431
Wildlife habitat management ..... acres	5,047,066	21,403,492
Wildlife watering facility ..... No.	1,030	53,681
Woodland direct seeding ..... acres	11,921	568,493
Woodland improved harvesting ..... acres	1,383,210	28,426,671
Woodland improvement ..... acres	473,135	14,308,165
Woodland site preparation ..... acres	133,091	3,546,040
Land treated		
Land adequately treated ..... acres	43,722,444	587,650,511
Land use conversions [1]		
Cropland to grassland ..... acres	1,099,762	22,463,522
Cropland to woodland ..... acres	60,024	2,585,293
Cropland to wildlife—recreation ..... acres	78,235	1,214,460
Cropland to "other" ..... acres	81,875	4,640,104
All other uses to cropland ..... acres	197,956	6,683,785
All other uses (except cropland) to wildlife—recreation ..... acres	490,635	6,820,293

[1] Conversions on the land June 30, 1970, are estimates of conversions since July 1, 1962.

"fish farming" have resulted in the opening of new fish-processing plants, particularly in the Southeast. These provide new rural job opportunities as well as an outlet for farm products.

Plant materials

Two new varieties of woody plants with promise for conservation uses were released by SCS after evaluation in Plant Materials Centers and in the field.

"Arnot" bristly locust, for critical area stabilization and beautification, and "Rem-Red" amur honeysuckle, were released for broad use in the Northeast.

"Lutana" cicer milkvetch, a forage legume, was released in the West.

A vigorous new variety of American beachgrass "Cape," is showing promise for conservation service in the mid-Atlantic area. It is nearly ready for release to commercial growers.

Studies continue to seek and adapt plants for special conservation uses at the 20 SCS Plant Materials Centers and on farm and other land owned by conservation district cooperators.

Around the world

Thirty-nine SCS employees were on long-term assignment in seven countries in 1970. They were assisting in development of conservation programs and helping people acquire new skills in the use and protection of natural resources.

Four SCS specialists completed short-term assignments in four countries giving consulting assistance.

Some 369 individuals traveled to the United States during the fiscal year to learn conservation skills. They spent about 5,000 man-days with SCS conservationists in various states.

Conservation Needs Inventory

Final figures in the Conservation Needs Inventory, the detailed study of nonfederal land (about 65 percent of the Nation), became available for use. The inventory showed that rural land in land-capability classes I, II, and III, suitable for regular cultivation, totals 630,771,000 acres. Land in class IV, suitable for limited cultivation, totals 180,441,000 acres. The national summary now being prepared for publication contains useful, basic information for hundreds of groups and organizations. ♦

Conservation in action...

Water users waste less, enjoy more

Idaho

In Owyhee County, Idaho, resource development is an idea that caught on quickly. It gained momentum as it went along.

One of the obvious problems faced by area farmers — as the Owyhee Soil Conservation District supervisors had pointed out—concerned water. Too much irrigation water, a principal resource, was being lost.

At the suggestion of the district board, a county planning committee looked into the possibility of saving water through improvement of irrigation systems.

When irrigation company directors talked over the possibilities with resource development specialists, interest spread. Reorganization of systems, it appeared, could pay attractive dividends in water saved.

The Soil Conservation Service delved into opportunities for water conservation, erosion prevention, and the economic aspects of system overhaul. The Owyhee extension agent, Jesse Wilson, reported on weed control, solution of drainage problems, and improved water management. Gaylord Harward of the Farmers Home Administration and Gene Showalter of the Agricultural Stabilization and Conservation Service explained how loans and cost-sharing could aid the work.

Concrete lining of irrigation ditches—one direct result of resource development planning in the Owyhee District.

The activity resulted in reorganizing three large irrigation systems, with full consideration for improving the environment. Seventeen miles of concrete-lined canal and nearly 100 new irrigation structures have been installed to conserve and accurately measure water apportioned to farms.

The farmers in turn have entered enthusiastically into the effort by improving onfarm systems and cropping practices. Pasture seedings have taken a sharp jump as landowners use improved grasses to take advantage of the potential offered by better water management.

Alvin Benson, a supervisor of the Owyhee District and president of the West Reynolds Irrigation District, believes the improvements are a direct payoff from the resource planning process.

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Boys of Scout Troop 27 plant pine seedlings.

Apples and opportunity ripen in the Pri-Ru-Ta RC&D Project.

"When we studied our potential from all angles, we could see where to concentrate our efforts to do the most good with the resources we had," Benson said. — JOHN K. NOYES, *district conservationist, SCS, Marsing, Idaho.* ♦

Missouri

SCS helps with plan for rural retreat

When James Parker of Kansas City bought 27 acres in Johnson County, Mo., a few months ago, he and Mrs. Parker had in mind a pleasant spot for rural recreation. They also looked upon the site as a weekend outing spot for their son's Scout troop.

The tract borders U.S. Highway 50 northwest of Warrensburg. Parker asked the Johnson County Soil and Water Conservation District board for help in developing a conservation plan. The Soil Conservation Service team at Warrensburg provided the help needed.

A first step was a 3-acre lake. SCS conservationists designed and staked the dam. Parker got a private contractor to build it.

The SCS Plant Materials Center at Elsberry, Mo., provided test plantings—Emerald crownvetch for bank stabilization and Amur honeysuckle and autumn-olive for screening and wildlife cover. Parker bought Scotch pine and eastern redcedar from the Missouri Department of Conservation for windbreak planting. The department also furnished a beautification bundle—a variety of shrubs and trees—through a cooperative agreement with the district.

The Parkers' son, Walter, and other members of Scout Troop 27 spent several weekends this spring planting the shrubs and trees. Parker is elated at the outcome of this opportunity to "give the boys a chance to communicate with nature and at the same time put the soil and water conservation plan into action."—GEORGE R. HAYES, *district conservationist, SCS, Warrensburg, Mo.*

Wisconsin

Soil maps guide apple land buyers

In the Bayfield area of northwestern Wisconsin, the production of fine apples and other fruits is an industry with room to grow.

Present growers, realizing that a greater output would contribute to their own success, are inviting others to join in while the right land for fruit growing is available.

As an activity in the Pri-Ru-Ta Resource Conservation and Development Project, owners and prospective purchasers are making good use of interpretive soil maps in considering sites for new orchards.

An attractive brochure they are distributing tells of the area's potential, describes the soil character, and its limitations for orchard use.

When interest developed in expanded fruit-growing in the area as an RC&D activity, the Soil Conservation Service assisted with soil surveys. Special attention was given to identifying the soils best suited for apple and small fruit production. University of Wisconsin extension specialists helped with the guidelines needed.

The information, in language that can be readily understood by those not already schooled in fruit growing, went into the brochure, along with information on management in successful production.

The publication was financed partly by local people through the Bayfield County Soil and Water Conservation District and by state funds appropriated by the State Legislature for such projects.

Response to the invitation to join in fruit growing in the Bayfield District has been favorable. An increasing number of requests are coming in for detailed information and onsite investigations from fruit producers.—STEVE W. PAYNE, *soil scientist, SCS, Ashland, Wis.*

Pennsylvania

Farm pond tapped for fire protection

Ask any fireman what he dreads most and he probably will tell you it is a call to fight a rural fire. Too often, water is unavailable or inaccessible. There is little a fireman can do but watch the place burn.

A program to give the firefighter better odds in control of rural fires is being developed in Mercer County, Pa. Selected farm ponds with special hydrants are its backbone.

Pauline Marsh, housewife and secretary to the County Association of Township Supervisors, is one of the supporters of the project. She has seen too many fires destroy homes and barns because of an inadequate supply of water. The problem is growing as the countryside fills with new homes, shopping centers, and recreation areas.

"I can't recall who came up with the idea of using ponds in a countywide fire protection system," Pauline said. "But it's a good one and is included as one of the objectives of the Penn-Soil RC&D Project. We have a number of ponds that hold a lot of clean water. It wasn't difficult to convince the township supervisors or the fire companies of the merit of the project or to work together in setting it up."

The first step was to ask District Conservationist Dick Crowley of the Soil Conservation Service for the location of the ponds in the county. Ponds near roads and located to give good coverage were identified. The homemade hydrant that Crowley had designed was accepted as the standard.

The townships agreed to obtain needed rights-of-way to the ponds, buy the hydrants, and pay for installation, about $200 a pond. SCS provides the needed technical help in installing the hydrants, which are tested by the local fire companies. The companies also run an annual check to assure that the hydrants are working satisfactorily.

Several townships already have installed a number of hydrants. Four other townships appropriated funds for installing hydrants. They give the firefighter better odds and the property owner more peace of mind — and at bargain prices. — RICHARD H. CROWLEY, *district conservationist, SCS, Mercer, Pa.*

Missouri

SCS helps with lake, recreation planning

When the Washington, Mo., park commission expanded its park area with the buying of a 94-acre farm, an immediate project was the building of a lake. The Soil Conservation Service staff working through the Franklin County Soil and Water Conservation District was asked for technical help.

A survey by SCS led to the design and construction of a dam for a 13-acre lake, for which the local Lions Club contributed $8,000. The lake, with shelter houses, picnic tables, and barbecue pits nearby, has become a popular recreation center. Fishing for the bass, bluegill, and channel catfish has been heavy, and in winter the lake has provided skating. Parts of the area have been developed for fairgrounds, show arena, tennis courts, and ball diamonds.

A grant for further recreational development has been approved by the Bureau of Outdoor Recreation, with local civic groups donating matching funds. SCS technical personnel helped with the plan for the new improvements.—WILLIAM C. SHOTWELL, *district conservationist, SCS, Washington, Mo.*

Texas

Land scars healed, sediment halted

The Nueces River, looping across south Texas from west to east, is the water transport channel for a cluster of cities and industrial plants in Texas' coastal area.

To Mrs. Charles Thiele and Robert Stripling, owners of ranchland along the river near Sinton north of Corpus Christi, the river posed a special problem. Both had critical areas which were yielding sediment to the stream at an unusually rapid rate.

At about the same time both owners, as cooperators with the San Patricia Soil and Water Conservation District, asked the Soil Conservation Service for help in halting the erosion which was costing them valuable land and contributing heavy loads of sediment to the river.

Mrs. Thiele and Stripling, using SCS technical guidance, developed complete conservation farm plans. Each plan called for removing brush from the eroding areas and the shaping of gully banks. The soil in the shaping process was pushed away from the channel as much as possible to maintain the original channel condition.

The shaping completed, the areas were rootplowed to an 18-inch depth to promote moisture penetration. The surface was then smoothed. After rains had replenished moisture in the soil, the areas were sprigged with Coastal bermudagrass.

Fertilization, weed control, and conservation management have produced the desired protection. The erosion is under control. Sediment no longer flows into the Nueces from the areas. Cattle now graze the gentle slopes, a profitable income source.

In addition, as Mrs. Thiele readily points out, the countryside has acquired a far more pleasing prospect.

"Some of the people here were skeptical about controlling erosion by any means in this watershed," she recalled. "We have solved the problem, and, with good maintenance and management, we should have no further trouble."

Conservationists who have seen the change are quick to agree.— MARTIN E. VAVRA, *engineering field specialist, SCS, Austin, Tex., and* G. P. JOHNSON, *civil engineer, SCS, Alice, Tex.* ♦

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Meetings . . .

NWGA looks to young people

After several "down years," the sheep industry is looking at its powerful potential for the future. The outlook and other interesting topics will be discussed at the 106th annual convention of the National Wool Growers Association in Las Vegas, Nev., January 18-21, 1971.

A repeat of a successful panel discussion at last year's meeting will feature young people in the sheep industry and the way they see the future.

Two industrywide groups will meet immediately before the convention opens: The Industrywide Lamb Planning Committee and the Industrywide Wool Planning Committee.

A special post-convention tour to Mexico is planned.

ANCA convention expands its horizons

The American National Cattlemen's Association has felt the need for some time to present a broader scope of the cattle industry at its annual conventions. Its theme at the Association's 74th annual convention January 24-28, in Las Vegas, Nev., is "Expanding Horizons." A trade show and special programs are included.

"What Consumers Think of You," "Expanding Horizons in Beef Production," and "Money-Management Revolution in the Beef Cattle Industry" are a sample of the new format.

Cooperatives and rural America in the 1970's

The National Council of Farmer Cooperatives meets January 9-13 in Washington, D.C.

Discussion topics include "Farmer Cooperatives' Image on Capitol Hill;" "Inside Washington;" "The Shape of Rural America in the 70's;" "The Crisis in Transportation;" "Issues of the 70's" (a four-man Congressional panel); and "Success Goes to Those Who Communicate."

Workshops for land improvement contractors

The Farm and Industrial Equipment Institute, the Land Improvement Contractors of America, and SCS will sponsor four 2-day workshops for land-improvement contractors:

January 20-21, Jackson, Tenn.

January 26-27, Manchester, N.H.

February 1-2, Madison, Wis.

February 4-5, Denver, Colo.

Subjects to be studied include trends for the contracting business in 1971; public and private work opportunities; soils and methods of testing; profit from earthmoving; control of erosion, pollution, and other problems in drainage and irrigation; keys to production and cost estimating; safety on the job; new sales approaches; bidding on government contracts; and elements of a finished job.

Dates and places

January 9-13, National Council of Farmer Cooperatives, Washington, D.C.

17-21, National Association of Home Builders, Houston, Tex.

February

18-21, National Woolgrowers Association, Las Vegas, Nev.

24-28, American National Cattlemen's Association, Las Vegas, Nev.

7-11, National Association of Conservation Districts, Chicago, Ill.

15-18, American Society of Range Management, Reno, Nev.

20-24, American Association of School Administrators, Atlantic City, N.J.

21-24, American Road Builders Association, Los Angeles, Calif.

22-24, Sprinkler Irrigation Association Technical Conference, Denver, Colo.

24-26, Land Improvement Contractors of America, Indianapolis, Ind.

24-27, National Farmers Union, Washington, D.C.

26-28, Family Camping Federation, St. Louis, Mo. ♦

Review

Our Soils and their Management. By Roy L. Donahue. *1970. 3d ed. Interstate Printers and Publishers, Danville, Ill. 683 pp., illus. $10.75.*

This is the third edition of this practical book on managing soils for efficient production. It is directed largely toward vocational agriculture students and teachers and to practicing farmers. The style is down to earth. It is easy to read and understand. The author supports his conclusions with a wide range of resource material and he lists a great variety of additional references for further reading.

Basically the book is a "how-to-do-it" treatise on managing soils for greater production, with enough soil science for the student who wants to know why. Each chapter is followed by a discussion of a demonstration or activity. This feature can be particularly useful to a teacher or to a discussion leader.

Sample chapter headings are: How to judge land; organic matter; lime and its use; fertilizers—what they are, how to use them; tillage problems; water conservation; soil conservation; irrigation; drainage; managing soils and water for field crops; managing soils and water for gardens and lawns; managing soils and water for pasture, for ranges, for orchards, and for forests.

The author has added a comprehensive new chapter on "Job Opportunities in Agricultural Technologies and Professions." In it he discusses the requirements for becoming a soil conservationist, soil scientist, and the possibilities for employment in these and other agriculture-related activities. — A. B. Foster, *formerly chief, Education and Publications Branch, Information Division, SCS, Washington, D.C.*

River of Life. *1970. U.S. Department of the Interior. Conservation Yearbook 6. 96 pp., illus. $2.00.*

The Department of the Interior makes *Water: the Environmental Challenge* the theme of its sixth annual report prepared in the form of a colorful "conservation yearbook."

Like the USDA *Yearbook of Agriculture* of much longer standing Interior's new yearbook series each year considers in depth a timely subject. To a greater degree, however, it retains the role of annual report by giving specific accounts of activities of the several agencies of the department. Necessarily, the result is a compromise between the two objectives; this year, for example, only the water- and environment-related activities of the agencies are reported.

As a subject-matter treatment, this yearbook is perhaps the best of the series. It is informative, well written, and handsomely illustrated. The introductory treatment of the hydrologic cycle and world water supply is an unusually concise and lucid summary of this vast and complex subject.

In discussing *Water: the Environmental Challenge,* the yearbook editorially concludes, "Of all our resources, we have mismanaged water the most." The report tells what each USDI agency has done recently to counter this unfortunate condition.—B.O.O.

Weather Economics. EDITED BY JAMES A. TAYLOR. *1970. Pergamon Press, Oxford and New York. 140 pp., illus. $8.00.*

This volume contains the eight papers and discussion presented at the 11th annual Aberystwyth (Wales) symposium on agricultural meteorology. It provides a lively account of how a number of weather-related problems in agriculture and forestry are being dealt with in the United Kingdom.

Annual benefits of 30 million dollars accrue to British agriculture from use of presently available weather information, at a cost-benefit ratio of 20 to 1. Benefits are greater for higher levels of management.

The symposium emphasized that weather protection and avoidance should be costed realistically in relation to benefits. This is a good point to make. On the other hand, the symposium, in relating economics primarily to the weather forecast rather than to climate, added a major uncertainty; namely, the accuracy of the unspecialized forecast for a specific, applied use. This means that much of what appears in the book is very interesting discussion but is not guidance. Perhaps if the symposium had had the reverse emphasis—namely, on climate—the book would have been much duller but of more value to conservationists in the use of climatology.—FRANKLIN NEWHALL, *climatologist, SCS, Hyattsville, Md.*

New publications

Hydrologic Data for Experimental Agricultural Watersheds in the United States, 1963. COMPILED BY HAROLD W. HOBBS AND JAMES B. BURFORD. *1970. USDA Misc. Publ. 1164. 465 pp., illus. $4.* Presents annual basic data on monthly precipitation and runoff; long-term mean monthly precipitation; annual maximum discharges and volumes of runoff; and daily air temperature, precipitation, and discharge. Selected runoff events with associated data are included on rainfall, land use, and antecedent conditions for agricultural watersheds in Arizona, Florida, Georgia, Idaho, Illinois, Iowa, Mississippi, Missouri, Nebraska, New Mexico, New York, Ohio, Oklahoma, South Dakota, Texas, Vermont, Virginia, West Virginia, and Wisconsin.

Eleven Authorized Flood Prevention Watersheds. *Rev. 1970. USDA Soil Conservation Service SCS CI-15 13 pp., illus.* Describes progress in 11 large watersheds selected in the 1940's for planning and installing measures to reduce water runoff, control erosion, and slow down streamflow. The work, carried out under the responsibility of the Soil Conservation Service and the Forest Service, paved the way for the watershed program under Public Law 566.

A Practical Guide to Water Quality Studies of Streams. BY F. W. KITTRELL. *1969. U.S. Dept. Interior, Federal Water Pollution Control Administration CWR-5. 135 pp., illus. $0.70.* Devotes each chapter to a single factor, principle, or procedure involved in studies of water quality, such as objectives of stream studies, physical characteristics, etc., and suggestions for preparation of a report on water quality.

Private Assistance in Outdoor Recreation. *1970. U.S. Dept. Interior, Bureau of Outdoor Recreation. 82 pp. $0.45.* A directory of organizations providing aid to individuals and public groups.

National Parks of the United States, Northeast, Southeast, Midwest, Southwest, West, Washington, D.C., New York City. *1968. U.S. Dept. of Interior, National Park Service.* $1.50. A packet containing eight folders on the national parks.

Soil-Temperature Regimes — Their Characteristics and Predictability. BY GUY D. SMITH, FRANKLIN NEWHALL, LUTHER H. ROBINSON, AND DWIGHT SWANSON. *1964, reprinted 1970. USDA Soil Conservation Service SCS-TP-1964. 14 pp.,* illus.

1970 Handbook of Agricultural Charts. *1970. USDA Agr. Hbk 397. 145 pp., illus. $0.65.* Charts depict the domestic situation, foreign production and trade, population and rural development, and commodity trends.

Sharing Our Land With Wildlife. *1970. USDA Soil Conservation Service. [16 pp.], illus.* Narrative guide for color slide set and film strip C-177.

Your United States Department of Agriculture. *1970. USDA PA-824. 14 pp.* Summarizes the work of the Department.

Soil surveys

Berks County, Pennsylvania. BY FRANKLIN S. ACKERMAN. *1970. 125 pp., illus.; maps 4 inches to the mile (1:15,840).* Soils surveyed by Franklin S. Ackerman, J. B. Carey, Milton French, William D. Hannigan, Herbert Hopper, William H. Houck, Raymond Mattern, Earl Reber, Edward Ropel, and David Taylor.

Sequoyah County, Oklahoma. BY EDWARD J. ABERNATHY. *1970. 57 pp., illus.; maps 3.17 inches to the mile (1:20,000).*

Ozaukee County, Wisconsin. BY DALE E. PARKER, DONALD C. KURER, AND JOSEPH A. STEINGRAEBER. *1970. 92 pp., illus.; maps 4 inches to the mile (1:15,840).*

Recon . . .

A job for all

"Our farmers and conservationists with the help of the USDA and other government agencies . . . have managed to create through the stewardship of soil, water, and forest resources the most abundant food supply the world has ever seen—plus safer drinking water for a higher percentage of our people than ever before—plus facilities for recreation unmatched in history—plus vastly increased opportunities for fishing and hunting . . .

"Our farmers, ranchers, and foresters as a whole have done more than any other part of our society to improve the natural environment.

"There is a vast amount of conservation work remaining to be done—work that will demand many people, many talents, and many dollars . . .

"We must continue to strive for a maximum of harmonious action among the several Federal agencies and departments (and) better Federal-State working relationships show citizens how they can help . . . carry the message far and wide that conservation is everybody's problem . . . that all of America has a stake in the proper use of soil whether it is privately or publicly owned—in fish, game, and other wildlife on private as well as public preserves—in parks, playgrounds, and other recreational areas in private or public hands—in natural beauty in our cities, along rural roads, beside a creek or mighty river—in having clean water, adequate water, but not floods . . .

"Just as all of America has a stake in natural resource conservation, so also all of America has a very big stake in human conservation.

"What we must finally learn is that all of our environments—natural, economic, social, educational, and cultural—are interconnected. They tend to merge and affect one another. And we can overlook this fact only at our peril as a civilized society."—UNDER SECRETARY OF AGRICULTURE, J. PHIL CAMPBELL, *Waterloo, Iowa, September 14, 1970.*

South Africa's updated Soil Conservation Act in effect since last December has similar aims to those so often stated by conservation districts and SCS; but the implied means differ a little. In reference to apparent apathy among farmers in a key watershed, the National Veld Trust's monthly magazine said recently, "To persuade the rest by means of propaganda and educational campaigns to take action will be too slow a process, even if there are enough extension officers. The new Soil Conservation Act does, however, make provision for compulsion and the prosecution of laggards."

Shaping our land

"Now is the time, while we still have some elbow room, to take a hard critical look at our land and how we want to use it . . .

"How land can be put to best use for the greatest number of people is a matter that could be . . . a key to America's future. It involves such vital issues as: adequate supplies of pure water, continuing abundance of farm products, living and working space for a growing population, protection of species and ecological systems, development of increased transportation facilities . . . industrial and power plants, and the creation of safer, pleasanter environments for recreation and cultural purposes . . .

"The area of America's usable land is fixed, by and large. How land is to be apportioned . . . will have to be governed, sooner or later, by sensible, carefully thought out guidelines . . . The Department of Agriculture and numerous other agencies of government at Federal, State, and local levels will have important contributions to make.

"Since most of the land involved is privately owned, many of the decisions for formulating and carrying out national land use policy will be made by landowners . . .

"The Department of Agriculture has long had a leading role in the national land policy area, a tradition reflected in the Department's many rural development programs—experience in conservation, in the use of credit, and in planning.

"The millions of acres of National Forests and Grasslands are important assets. So, likewise, are the cooperative programs that are under way with State departments of agriculture, experiment stations, land grant educational institutions and other universities, and the State extension services. There are the ASC county committees and more than 3,000 local conservation districts; and hundreds of thousands of farmers cooperating under voluntary agreements.

"An outstanding example of USDA's capabilities may be found in some of the magnificent work of the Soil Conservation Service, which has been concerned with environmental improvement for 40 years.

"All together, these represent experience, "know how," leadership, facts, and organization—all necessary ingredients in further developing and carrying out a coordinated and innovative program of land use."—SECRETARY OF AGRICULTURE, CLIFFORD M. HARDIN.

If it's fit to print, keep it out of the garbage is the word in more and more communities as they work to recycle newsprint. Several firms across the Nation are doing a brisk business in repulping old newspapers since a workable de-inking process came on the market in the early 1960's. What's in it for the community? An article in the August 1 issue of *Editor & Publisher* magazine said that newsprint may represent as much as 40 percent of a homeowner's garbage yield. Recycling it lowers air pollution, refuse disposal costs, and newsprices; and every ton of newsprint salvaged saves 17 trees.

"Green Survival Depends On You," is the theme of an advertising campaign sponsored by the American Association of Nurserymen, Inc. More than 350 merchandising kits containing mobiles, bumper stickers, posters, buttons, and plant tags have been sold to members for use in their own communities. Sample radio announcements and press releases have been used. The campaign has proved to be a popular way to sell plants, landscaping advice, and a constructive attitude toward home-based conservation efforts. A popular item is the 12-page booklet, *Green Survival and the Environmental Crisis.* Single copies are available at no charge from AAN, 835 Southern Building, Washington, D.C. 20005.

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Buffelgrass finds Puerto Rican home

A strain of buffelgrass native to the low rainfall region of South Africa appears to have won a respected place among conservation plants on the semiarid southwest part of Puerto Rico.

In a decade it has proved to be one of the important new forage grasses on the island.

Burning, overuse, land clearing, and periods of drought over the years had altered the grass communities on the island's semiarid sites. Less useful grasses took over. The need became urgent for a grass that would thrive and efficiently produce under natural conditions.

Buffelgrass T-4464 was introduced to the island by the Soil Conservation Service in 1959 in the SCS program of assembly and evaluation of plants. It is a perennial bunchgrass that attains a height of 6 inches to 4 feet, depending on soil and moisture conditions. Culms develop from buds emerging from a tough knotty crown. The root system extends to an unusual depth. The plant produces abundant, medium-fine leaves of intense green. Seed is abundantly produced all year but especially in late fall.

Success of plantings to date indicate that buffelgrass T-4464 is well adapted for pasture and hay uses under the adverse climate conditions prevailing in the Caribe, Sur, and Suroeste soil conservation districts in Puerto Rico. Plantings have been established on more than 3,500 acres of Coamo, Descalabrado, Santa Isabel, Fraternidad, Jácanas, Amelia, Sosa, and Americus soil series.

Experiments have shown that buffelgrass produces exceptionally heavy amounts of roots an acre to make the soil more fertile and less susceptible to erosion. To this can be added the role of organic matter in improving the soil's water-holding capacity.

Forage value of buffelgrass is high. Recovery from grazing is excellent. When adequately fertilized and irrigated, harvest intervals can be reduced to every 45 days. Hay is of excellent quality and of high nutritive value when compared to imported hay.—AURELIO SIERRA-BRACERO AND EMERITO MARTINEZ-RUIZ, *plant materials specialist, SCS, Mayagüez, and information officer SCS, San Juan, Puerto Rico.* ♦

Buffelgrass makes lush growth on a farm in the Suroeste District.

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